

AMENDMENT TO THE DRAWING

Please replace the drawing sheet for FIG.5 with the enclosed drawing sheet marked as "Replacement Sheet".

### REMARKS

This communication is in response to the Office Action mailed on March 27, 2007. In the Office Action claims 1-31 were pending of which claims 1-31 were rejected.

The Office Action next reports that the drawings were objected to because reference 502 in FIG 5 should have been labeled reference 508. FIG. 5 has been corrected as required with a replacement sheet submitted herewith.

The Office Action next reports the following informalities: Claim 1 was objected to due to the preamble, "A computer readable medium including instruction readable by a computer..." The Office Action then states that the examiner interpreted the preamble as "A computer readable medium storing, instructions readable by a computer..." Claim 1 has been amended as suggested.

#### Rejections based on non-statutory subject matter

The Office Action next reports that claims 1-13 and 15-24 were rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. In particular, it was asserted that independent claim 1 preempts a computer readable medium which according to the specification embodies a modulated data signal. Further, the Office Action states that a signal interpreted as an abstract idea is a subject matter that is not a practical application or use of an idea, a law of nature, or a natural phenomenon and so is not patentable subject matter.

#### 1. THE LAW OF PATENTABLE SUBJECT MATTER

35 U.S.C. §101 extends the offer of patent protection to "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof". As Congress commented in passing the statute, it was intended to cover "anything under the sun that was made by man", and the Supreme Court and the Court of Appeals for the Federal Circuit have both reiterated that observation, along with noting that the repeated usage of the word "any" applied to expansive descriptions of subject matter, were intended to emphasize that no restrictions were to be placed on patentable subject matter other than those specifically recited in §101. (S. Rep. No. 1979, 82d Congress, 2d Sess., 5 (1952); *Diamond v. Chakrabarty*, 447 U.S.

303, 206 USPQ 193 (1980); *State Street Bank & Trust v. Signature Financial Group*, 47 USPQ2d 1596, 1600 (Fed. Cir. 1998) (Rich, J.).)

Claims directed to methods have been found to be within the "process" category of §101. *AT&T Corp. v. Excel Communications, Inc.*, 50 USPQ2d 1447, 1450 (Fed. Cir. 1999) and MPEP §2106 IV A. Claims with functional material recorded on a computer-readable medium have been found to be within the "machine" category of § 101 and are considered statutory. In re Lowry, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) and MPEP §2106.01. Further, MPEP 2106 provides under the heading "Statutory Subject Matter" provides that " For the purposes of an 35 U.S.C. §101 analysis, it is of little relevance whether the claim is directed to a machine or process. The legal principles are the same. *AT&T Corp. v. Excel Communications, Inc.*, 50 USPQ2d 1447, 1451 (Fed. Cir. 1999)

Despite the seemingly limitless expanse to patentable subject matter, the Supreme Court has identified three categories of unpatentable subject matter: "laws of nature, natural phenomena, and abstract ideas." *Diamond v. Diehr*, 450 U.S. 175, 185, 209 USPQ 1 (1981) However, determining what is an "abstract idea" has been difficult for the courts. As noted by the U.S. Court of Appeals for the Federal Circuit "this court (and its predecessor) has struggled to make our understanding of the scope of §101 responsive to the needs of the modern world." *AT&T Corp. v. Excel Communications, Inc.*, 50 USPQ2d 1447, 1452 (Fed. Cir. 1999)

In *AT&T*, the Federal Circuit gave some guidance by stating that "the mere fact that a claimed invention involves inputting numbers, calculating numbers, outputting numbers, and storing numbers, in and of itself, would not render it nonstatutory subject matter, unless, of course, its operation does not produce a 'useful, concrete and tangible result.'" *AT&T* at 1453. The formation of a 'useful, concrete and tangible result' in a claim constitutes a practical application of a mathematical algorithm, formula, or calculation and is therefore patentable subject matter. *State Street* at 1601.

Similarly, the Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility as found in MPEP 2106 (IV)(C) indicates that abstract ideas are not patentable subject matter under 35 U.S.C. §101 but that "practical applications" of abstract ideas

are patentable subject matter. A claimed invention is a practical application of an abstract idea if either:

"The claimed invention 'transforms' an article or physical object to a different state or thing." or

"The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below." (MPEP 2106(IV)(C)(2))

Note that the case law and the Interim Guidelines do not require a claimed use for the "useful, concrete and tangible result". They only require the production of a "useful, concrete and tangible result."

The question then becomes: What constitutes a "useful, concrete and tangible result?"

The term "useful" appears in §101 and requires nothing more than a specific, substantial and credible utility. (MPEP 2107.01)

The terms "concrete" and "tangible" have not been directly defined. However, a review of recent cases that have attempted to use this standard is instructive.

The phrase "useful, concrete, and tangible result" first appears in *In re Alappat*, 31 USPQ2d 1545 (Fed. Cir. 1994). The claims at issue in *Alappat* were directed to a rasterizer that included as a last limitation "means for outputting illumination intensity data as a predetermined function of the normalized vertical distance." Thus, the "result" in *Alappat* is "illumination intensity data", which was considered concrete and tangible. This data is nothing more than numbers that represent a specific intensity level for light that may appear on a display at some point in the future. Nonetheless, the data was considered patentable subject matter.

In *State Street Bank & Trust v. Signature Financial Group*, 47 USPQ2d 1596, 1600 (Fed. Cir. 1998), the Federal Circuit built on the "useful, concrete and tangible result" test by finding that a data processing system that produces "price, profit, percentage, cost, or loss" provides a useful, concrete and tangible result even though these values are expressed as numbers. *State Street Bank* at 1602. The numbers identified as a useful, concrete and tangible result merely represent the state of an accounting system for a mutual fund. In addition, the claims in *State*

*Street Bank* do not recite a use for these values. Thus, the values produced were considered "useful, concrete and tangible" even without a claimed use for those values.

Lastly, in *AT&T Corp. v. Excel Communications, Inc.*, 50 USPQ2d 1447, (Fed. Cir. 1999), the Federal Circuit applied the "useful, concrete and tangible result" test to a method claim. In *AT&T*, a method is provided for generating a message record that includes a PIC indicator. This message record represents a call made on a telephone system. The message record was considered a "useful, concrete and tangible result" even though it is only a collection of data representing a telephone call. In addition, as in *State Street Bank*, the claims in *AT&T* did not include a use for the result of the method. In particular, the claim in *AT&T* simply claims producing a message record. Thus, a method claim does not need to include a use for a result of the method but instead simply has to generate a "useful, concrete and tangible result" in order to be considered a practical application of the method.

## 2. APPLICATION OF THE LAW TO THE CLAIMS

### Claim 1

Independent claim 1 has been amended to recite a computer readable storage media storing instructions that cause the computer to resolve an overlapping ambiguity string in an input sentence of an unsegmented language. It is believed that claims with functional material recorded on a computer readable storage media have been found to be within the "machine" category of § 101 and are considered statutory.

In the specification on page 7, lines 17-24 a description of computer readable storage media is provided. For example, computer readable media includes any available media including both volatile and non-volatile media, removable and non-removable media. It is submitted that a computer readable storage media as found in the specification represents a computer element which defines structural and functional interrelationships between the computer-executable instructions and the rest of the computer and which permits the computer-executable instruction's functionality to be realized. Such computer-readable storage media are statutory. (MPEP 2106.01 (I))

Further, the specification at page 1, lines 9-15 describes the usefulness of word segmentation. For example, word segmentation is useful in spell-checking and grammar checking, information retrieval, and other natural language processing tasks. In claim 1, this segmentation process also includes resolving ambiguities in unsegmented languages such as Chinese during word segmentation. Claim 1 has been amended to recite "outputting an indication for..." Support for this amendment is found at least at page 21, lines 13-21, or page 22, lines 5-13. Thus, it is believed that claim 1 provides a practical application of its steps because it produces a "useful, concrete and tangible result."

Since claim 1 falls within one of the statutory classes and provides a useful, concrete and tangible result, it represents statutory subject matter under the current case law and the MPEP.

#### Claim 14

Similarly, independent claim 14 is directed to a method of segmentation of a sentence of an unsegmented language where the sentence includes an overlapping ambiguity string. Therefore, it falls within the "process" category of §101. See 35 U.S.C. 100(b) ("The term 'process' means process, art, or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material."). As stated above, it is irrelevant whether a claim is directed to a machine or process. The legal analysis is similar.

Claim 14 has been amended to recite "outputting an indication for..." Thus, claim 14 also provides a practical application of its method because it produces a "useful, concrete and tangible result." Furthermore, the word segmentation of a text string having an overlapping ambiguity string is a useful in performing word processing tasks such as spell-checking and grammar checking, information retrieval, speech recognition, and the like. As such, claim 14 represents statutory subject matter under the current case law and the MPEP.

#### Rejections based on obviousness

The Office Action next reports that claims 1-4, 6-7, 14-21, 23, 25-26, and 28 were rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent No. 5,806,021 to Chen et al. (hereinafter Chen) in view of U.S. Patent No. 6,968,308 to Brockett et al. (hereinafter Brockett)

Claim 1 has been amended. It is respectfully submitted that the cited references do not teach

or suggest all the features of claim 1. Claim 1 recites a computer readable storage media storing instructions readable by a computer which, when implemented, cause the computer to resolve an overlapping ambiguity string in an input sentence of an unsegmented language by performing steps comprising segmenting the sentence into two possible segmentations, recognizing the overlapping ambiguity string in the input sentence as a function of the two segmentations, obtaining probability information based on at least one context feature adjacent the overlapping ambiguity string, and outputting an indication for selecting one of the two segmentations as a function of the obtained probability information. [emphasis added]

An overlapping ambiguity string (OAS) often occurs in unsegmented languages such as Chinese. An OAS is a string of characters, such as represented by "ABC" where each of "A", "B", and "C" are characters. An overlapping ambiguity occurs when there are two or more possible segmentations. In the present example, possible segmentations include "AB/C" or "A/BC". Claim 1 includes features that resolve the OAS so that the more probable segmentation is selected as correct.

In the present amendment, claim 1 has been amended to further clarify that the overlapping ambiguity string (OAS) is resolved in part by obtaining probability information that is based on at least one context feature that is adjacent the OAS. It is noted that in most cases, the at least one context feature is one or more words to the left and/or right of the OAS. However, a context feature can also be a grammatical symbol or other feature in the text. This probability information is constructed beforehand from tokenized corpus where the overlapping ambiguity strings are replaced by tokens. The probability information is stored for later access during actual text segmentation.

In contrast, the primary reference Chen discloses automatic segmentation of continuous text using statistical approaches. It is respectfully submitted that this segmentation process is very different from the features of claim 1. It is believed that Chen includes Forward Maximum Matching (FMM) segmentation and Backward Maximum Matching (BMM) segmentation. If the results are the same then the segmentation is accepted. If the results are different then the likelihood of both the FMM segmentation and BMM segmentation are calculated. The segmentation with the

higher likelihood is chosen as the correct segmentation. The Office Action correctly states that Chen does not disclose recognizing the overlapping ambiguity string (OAS) in the input sentence as a function of the two segmentations and replacing the OAS string with tokens.

However, more importantly, it is submitted that Chen also does not include the feature of obtaining probability information based on at least one context feature adjacent the overlapping ambiguity string.

The secondary reference Brockett discloses a method of segmenting non-segmented text using syntactic parse. However, Brockett describes that Japanese language uses four different kinds of script including Kanji, hiragana, katakana, and roma. These four scripts can be used to spell the same word. Thus, the methods of segmenting according to Brockett are designed to segment words in a way that accounts for these variations. [Col. 2, lines 4-8] Thus, it is believed that Brockett is also very different from the features recited in claim 1, and further, that Brockett in no way teaches or suggests all the features of claim 1.

In light of the foregoing, it is believed that claim 1 is patentable over the cited art. Claims 2-13 depend on claim 1 and are believed to be separately patentable. Reconsideration and allowance of claims 1-13 are respectfully requested.

Claim 14 has also been amended to recite a method of segmentation of a sentence of an unsegmented language, the sentence having an overlapping ambiguity string (OAS), the method comprising generating a Forward Maximum Matching (FMM) segmentation of the sentence, generating a Backward Maximum Matching (BMM) segmentation of the sentence, recognizing an OAS as a function of the FMM and the BMM segmentations, obtaining probability information based on at least one context feature and at least part of the recognized OAS for each of the FMM and BMM, and outputting an indication for selecting one of the FMM segmentation and the BMM segmentation as a function of obtained probability information. [emphasis added]

Thus claim 14 has been amended in a manner similar to claim 1. Remarks relating to claim 1 are herein incorporated. Thus, it is believed that claim 14 is patentable over the cited art. Claims 15-24 depend on claim 14 and are believed to be separately patentable. Reconsideration and allowance of claims 14-24 are respectfully requested.

Regarding independent claim 25, the Office Action states that Chen teaches determining a probability associated with each of the FMM segmentation of the overlapping ambiguity string and the BMM segmentation of the overlapping ambiguity string. Claim 15 is drawn to a method of constructing an information resource for performing word segmentation of a text sentence, not the actually segmentation itself. Claim 25 has been amended and recites a method of constructing information to resolve overlapping ambiguity strings in an unsegmented language comprising the steps of recognizing overlapping ambiguity strings in a training data, replacing the overlapping ambiguity strings with tokens, generating an N-gram language model comprising information on constituent words of the overlapping ambiguity strings and context features surrounding the overlapping ambiguity strings. [emphasis added] Thus, the amendment to claim 25 clarifies that context features surrounding the overlapping ambiguity strings are used in generating the N-gram language model.

The discussion of the cited references above is herein incorporated by reference. Thus is it submitted that claim 25 is patentable over the cited art because the cited art does not teach or suggest all of the features of claim 25. Claims 26-28 depend on claim 25 and are believed to be separately patentable. Reconsideration and allowance of claims 25-28 are respectfully requested.

The foregoing remarks are intended to assist the Office in examining the application and in the course of explanation may employ shortened or more specific or variant descriptions of some of the claim language. Such descriptions are not intended to limit the scope of the claims; the actual claim language should be considered in each case. Furthermore, the remarks are not to be considered exhaustive of the facets of the invention which are rendered patentable, being only examples of certain advantageous features and differences, which applicant's attorney chooses to mention at this time. For the foregoing reasons, applicant reserves the right to submit additional evidence showing the distinction between applicant's invention to be unobvious in view of the prior art. Furthermore, in commenting on the references and in order to facilitate a better understanding of the differences that are expressed in the claims, certain details of distinction between the same and the present invention have been mentioned, even though such differences

do not appear in all of the claims. It is not intended by mentioning any such unclaimed distinctions to create any implied limitations in the claims.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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